

CLAIMS

What is claimed is:

1. A medical grasping device comprising:
 - an elongate control member having an atraumatic distal tip section and a proximal end portion, the elongate control member further including a grasping portion positioned between the proximal end portion and the distal tip section;
 - an outer sheath having a distal end, a proximal end, and a passageway extending between the distal and proximal ends, the elongate control member being slidable within the passageway relative to the outer sheath; and
 - an actuation section connected to the proximal end portion of the elongate control member, the actuation section moving the grasping portion in and out of the distal end of the outer sheath, the actuation section including a retraction mechanism that biases the actuation section and hence the grasping portion towards a retracted state.
2. The grasping device of claim 1 wherein the grasping portion is drawn within the outer sheath in the retracted state.
3. The grasping device of claim 1 wherein the actuation section includes a slide member with a face and the retraction member includes a spring and a flange, the slide member being movable relative to the flange and the spring being positioned between the face and the flange.
4. The grasping device of claim 3 wherein the spring is a helical spring.

5. The grasping device of claim 5 wherein the spring is made from stainless steel.
6. The grasping device of claim 3 wherein the spring has an elongated state, the spring being in the elongated state when the retraction member is in the retracted state.
7. The grasping member of claim 6 wherein the spring is compressed from the elongated state when the actuation section moves the grasping portion out of the distal end of the outer sheath.
8. The grasping member of claim 1 further comprising a handle coupled to the outer sheath, the actuation section being mounted to the handle, the actuation section being movable in a reciprocal manner relative to the handle.
9. The grasping device of claim 8 wherein the actuation section includes a connecting block coupled to the elongate control member and positioned within a longitudinal slot of the handle, the connecting blocking being is movable along the slot between opposite ends of the slot.
10. The grasping device of claim 1 wherein the outer sheath is flexible and kink-resistant and has lubricious outer and inner surfaces.

11. The grasping device of claim 1 wherein the atraumatic distal tip section tapers to a blunt and rounded tip.
12. The grasping device of claim 1 wherein the grasping portion includes a plurality of preformed wire loops with proximal end portions joined to the elongate control member.
13. The grasping device of claim 12 wherein the wire loops are each made of a superelastic alloy.
14. The grasping device of claim 13 wherein the superelastic alloy is Nitinol.
15. The grasping device of claim 12 wherein the proximal ends of each loop has a cold-worked bend.
16. The grasping device of claim 12 wherein the plurality of wire loops self-deploy transversely relative to the outer sheath upon emerging from the distal end of the outer sheath.
17. The grasping device of claim 12 wherein each of the wire loops is substantially circular upon deployment from the distal end of the outer sheath.
18. The grasping device of claim 17 wherein each of the wire loops includes side sections that overlap with side sections of adjacent wire loops.

19. The grasping device of claim 12 wherein each of the wire loops is pie-shaped upon deployment from the distal end of the outer sheath, each wire loop having an arcuate outer section with a radius about equal to a radius of a deployment site of a vessel into which the grasping device is inserted.
20. The grasping device of claim 12 wherein each of the wire loops includes an arcuate outer section that upon deployment extends toward a wall of a vessel into which the grasping device is inserted.
21. The grasping device of claim 20 wherein each of the wire loops includes a distal portion, proximal ends joined to the elongate control member, and arcuate side sections extending between the distal portion and proximal ends and curving toward the distal end of the elongate control member.
22. The grasping device of claim 1 wherein the grasping portion includes four preformed wire loops that deploy transversely upon emerging from the distal end of the outer sheath, the wire loops being approximately equally spaced about a longitudinal axis of the elongate control member to generally occupy a full cross-section of a vessel into which the grasping device is inserted.